

cases were recruited in our study. **RESULTS:** The majority of the eligible Medicare beneficiaries responded “not at all likely” to take Part D (62%), and significant proportions also reported “not too likely” to take Part D (21.46%), while few of them reported “somewhat likely” (9.44%) and “Very likely” (6.31%). Results of weighted cumulative logit regression indicated that people who had cost barriers in medication use were significantly more likely to take up Medicare Part D (OR=2.62, 95% CI[2.00, 3.44],  $p<0.001$ ). Males and older adults were less likely to take up Medicare Part D (OR=0.83, 95% CI[0.74, 0.94] and OR=0.98, 95% CI[0.97, 1.00],  $p<0.01$ ). **CONCLUSIONS:** Results of this study indicated experiencing CRD was significantly associated with the probability of taking up Part D. CRN could be a motivation of taking up Part D. Thus, characteristics of beneficiaries who reported having CRN, especially those who continued to experience CRN after taking up Part D, need further studies.

#### MA4

##### COMPREHENSIVE ASSESSMENT OF PATIENT ADHERENCE TO DRUG THERAPY: AN EXAMPLE UTILIZING REAL WORLD DATA FOR AN ORAL MULTIPLE SCLEROSIS TREATMENT

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**OBJECTIVES:** Medication possession ratio (MPR) and persistence are typically used as measures of patients' drug use patterns. However, these measures may not capture all aspects related to real world dosing. We aim to explore additional approaches to enhance meaningful interpretation of patients' drug use patterns using persistence, adherence and average daily dose (ADD) data of dimethyl fumarate (DF) in a real world dataset. **METHODS:** A retrospective cohort study using the MarketScan Commercial and Medicare Databases (March 2013 – January 2014) was conducted in adult multiple sclerosis patients. Patients with DF claims who were continuously enrolled for at least 9 months before and after starting therapy were included ( $n=2,879$ ). Outcomes included time to treatment non-persistence (switch to another disease modifying therapy (DMT) or drug discontinuation of  $\geq 30$  days), adherence (MPR and percent of days covered (PDC)), and estimated ADD. Data were interpreted in the context of the FDA approved daily dosing (240 mg b.i.d.), and an earlier trial (1) reporting dose-related MRI findings indicating non-significant effects on brain lesions for 360 mg/day and 120 mg/day doses. **RESULTS:** The mean (SD) DF treatment duration was 96 (66) days (median 83) and 24% of patients became non-persistent. Mean (SD) MPR and PDC were 0.83 (0.26) and 0.75 (0.29), respectively. ADD (SD) was 417 mg/day (221) with 15.3% treated at  $< 240$  mg/day, 5.6% at 240–359 mg/day, 47.8% at 360–479 mg/day, and 31.3% at  $\geq 480$  mg/day (i.e., 20.9% treated at  $< 360$  mg/day and 68.7% treated at less than the labeled dose). **CONCLUSIONS:** The finding of a large proportion of patients receiving potentially sub-optimal treatment, as determined by ADD on DF, indicates significant potential clinical consequences for these patients. The approach used in this study could be used in other similar studies examining treatment adherence to enhance meaningful interpretation of adherence data. 1. Lancet 2008; 372(9618):1463–72.

#### MEDICAL DEVICE & DIAGNOSTIC RESEARCH STUDIES

#### MD1

##### ECONOMIC EVALUATION OF BST-CARGEL AS AN ADJUNCT TO MICROFRACTURE VERSUS MICROFRACTURE ALONE IN KNEE CARTILAGE SURGERY

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**OBJECTIVES:** Knee cartilage damage is a common cause of referral for orthopaedic surgery. Treatment aims to reduce pain and symptoms by repairing cartilage. Microfracture, the current standard of care, yields good short-term clinical outcomes; however, treatment might fail after 2–3 years. A Chitosan-Beta glycerolphosphate bioscaffold is used as an adjunct to microfracture and demonstrates improvements in quantity and quality of repaired tissue, potentially reducing the risk of treatment failure. This study aimed to establish the economic value of bioscaffold versus microfracture alone in knee cartilage repair from the societal perspective, using Germany as the reference market. **METHODS:** A decision tree with a 20-year time-horizon was constructed, in which undesirable clinical events were inferred following initial surgery. These events consisted of pain management, surgery and total knee replacement. Clinical outcomes were taken from the pivotal clinical trial, supplemented by other literature. Data and assumptions were validated by an internationally recognized Delphi panel. All relevant resource use and costs for procedures and events were considered. **RESULTS:** In a group of patients with all lesion sizes, the model inferred that bioscaffold yields a positive return on investment at year 4 (with 20-year cumulative cost savings of €6,448). Reducing the incremental risk of treatment failure gap between bioscaffold and microfracture by 25% to 50% does not alter this conclusion. Cost savings are greatest for patients with large lesions; Results for patients with small lesions are more modest. **CONCLUSIONS:** The Chitosan-Beta glycerolphosphate bioscaffold potentially represents a cost-saving alternative for patients with knee cartilage injury by reducing the risk of clinical events through regeneration of chondral tissue with hyaline characteristics. Since the burden of this condition is high, both to the patient and society, an effective and economically viable alternative is of importance.

#### MD2

##### COVERAGE LIMITS ON BLOOD GLUCOSE TEST STRIP REIMBURSEMENT FOR DIABETICS IN CANADA: UTILIZATION IMPACT FOR DIABETIC PATIENTS IN THE ONTARIO PUBLIC DRUG PROGRAM (OPDP)

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**OBJECTIVES:** In August 2013 the Ontario government implemented annual limits on the number of blood glucose test strips (BGTS) it will reimburse for people with diabetes. The change is based on research that shows BGTS have a limited clinical

benefit for diabetes patients who do not require insulin. Under the Ontario Public Drug Programs (OPDP), these patients have a 200–400 strip/year limit, whereas patients who require insulin can receive up to 3,000 strips annually. The policy intent was not to change BGTS utilization for insulin patients; however, concerns exist around potential negative impacts on diabetes management. The objective of this analysis is to quantify the impact of this new BGTS utilization policy in Ontario across diabetes patients based on their diabetes treatment. **METHODS:** All patients who received BGTS coverage from the OPDP during July 2012 – September 2014 were selected for analysis using the IMS Brogan OPDP Database. Annual BGTS utilization prior to the policy change (July 2012 – June 2013) was then compared to annual BGTS utilization following Ontario's coverage limit (October 2013 – September 2014). Patients were categorized into one of four cohorts based on their diabetes medication history: ‘insulin only’, insulin + oral anti-diabetic (OAD), ‘OAD’, or ‘neither’. Changes in utilization patterns were assessed for each cohort. **RESULTS:** 422,525 patients were identified for the pre-period, and 422,154 patients were identified for the post-period. Overall BGTS unit volume declined from 192M to 147M (-24%) following the OPDP policy change. On average, the number of BGTS per patient per year decreased for ‘OAD’ and ‘neither’ cohorts by 42% and 54%, respectively. Impact to patients managing diabetes with insulin was minimal: ‘insulin only’ (-1%) and ‘insulin + OAD’ (-2%). **CONCLUSIONS:** BGTS utilization markedly decreased in diabetes patients not managed with insulin; test strip utilization was marginally impacted for patients using insulin.

#### MD3

##### ECONOMIC IMPACT OF CHANGES IN NICU VENTILATION STRATEGIES WITH THE ADVENT OF NEW NONINVASIVE VENTILATION TECHNIQUES: A REVIEW AND PROPOSED ASSESSMENT FRAMEWORK FOR HIGH FLOW THERAPY (HFT) AS A ROUTINE RESPIRATORY SUPPORT PARADIGM

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**OBJECTIVES:** High flow therapy (HFT) has been demonstrated to be a safe and effective noninvasive respiratory support technique for the treatment of pre-term infants in neonatal intensive care units (NICU). Our objective was to develop a quantitative framework based on available evidence to estimate the economic impact of adoption of a HFT respiratory support strategy compared to current standard of care. **METHODS:** We constructed a model to estimate total cost per NICU episode of care by treatment strategy, considering utilization and duration of the different types of ventilatory support modalities – conventional mechanical ventilation (CMV), nasal continuous positive airway pressure (nCPAP) ventilation, and HFT – as well as utilization levels of surfactant, chest x-rays, blood gas analyses and total NICU length of stay. Model parameters were derived from a recent study comparing respiratory modality utilization between five US-based neonatal intensive care units (NICUs) adopting a HFT strategy and a larger pool of NICUs in the Vermont-Oxford Network (VON), and from single center experience. We computed the total cost difference between the respiratory support strategies based on published cost data. Parameter uncertainty was tested in sensitivity analyses. **RESULTS:** The base case analysis resulted in total average length of ventilation of 25.48 days for the non-HFT strategy (8.92 days nCPAP, 6.10 days HFT, 10.47 days CMV) and of 25.06 days (2.88 days nCPAP, 16.86 days HFT, 5.32 days CMV) for the HFT strategy. HFT was associated with total projected cost savings of \$2,317. Results were sensitive to length of HFT use, length of CMV, cost of HFT, and length of nCPAP support. **CONCLUSIONS:** Adoption of a HFT strategy appears to be associated with meaningful savings in total NICU episode of care costs, primarily resulting from reductions in the time of conventional mechanical ventilation. Further research is warranted to substantiate these findings.

#### MD4

##### ECONOMIC VALUE OF IMPROVED ACCURACY FOR SELF-MONITORING OF BLOOD GLUCOSE DEVICES FOR TYPE 1 DIABETES

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**OBJECTIVES:** To simulate and compare clinical and economic outcomes of self-monitoring of blood glucose (SMBG) devices along accuracy ranges and strip price. **METHODS:** We programmed a long-term type 1 diabetes natural history and treatment cost-effectiveness model. In phase one, using In Silico modeling validated by the Food and Drug Administration, we associated changes in accuracy error rates of SMBG devices to changes in HbA1c (holding hypoglycemic rates unchanged) and changes in severe hypoglycemia rates requiring an inpatient stay (holding HbA1c levels unchanged). In phase two, using Markov cohort simulation modeling, we estimated lifetime clinical and economic outcomes from the Canadian payer perspective. The primary comparison was a SMBG device with strip price \$0.73 Canadian dollars (CAD) with accuracy error rate of 10% versus a SMBG device with strip price \$0.60 CAD with accuracy error rate of 15%. Outcomes for the average patient, discounted at 3% per annum, were quality-adjusted life years (QALYs), costs, incremental cost-effectiveness ratios (ICERs), and budget impact. **RESULTS:** Assuming the benefits translate into HbA1c improvements only, the ICER with accuracy error rate of 10% versus 15% was \$11,500 CAD per QALY. Assuming the benefits translate into reduced severe hypoglycemic events that required an inpatient stay only, an SMBG device with accuracy error rate of 10% dominates (i.e., less costly, more effective) an SMBG device with accuracy error rate of 15%. Assuming SMBG errors only impact HbA1c improvements, and when varying all inputs simultaneously through a probabilistic sensitivity analysis, 91% of simulations were cost-effective at a willingness-to-pay of \$100,000 per QALY. The five-year budget impact findings ranged from \$0.0005 per member per month for HbA1c improvements to cost-savings for severe hypoglycemic event reductions. **CONCLUSIONS:** From the efficiency (cost-effectiveness) and affordability (budget impact) payer perspectives, reducing the error in SMBG devices appears to be an efficient and affordable strategy.